

the water reached the flood stage on the 28th. While there was a general rise in all the principal rivers in the district at this time, dangerous stages were not attained until after the close of the month.

Binghamton, N. Y.—A flood warning was issued on Friday, February 25, the rivers at that time being low. A special edition of the weather map was printed and sent to the postmasters at Great Bend, Susquehanna, Lanesboro, Pa., and Bainbridge, N. Y., with instructions to distribute them to persons interested in the river situation. Conditions were expected to be the severest at those places on account of gorges then in the river. In this warning it was stated that the rivers would probably begin to rise Monday, February 28, and would rise rapidly to bank-full stages, but that very high water was not anticipated, except possibly in the vicinity of gorges.

On Saturday, February 26, the warning was repeated.

The rivers began to rise, as forecast, Monday morning and the following warning, based on the weather conditions at that time, was issued by telephone, telegraph, mail, and published in the daily papers. "The rivers will continue to rise and will reach higher stages than have been reached for several years past." This was followed by more detailed information as the flood progressed.

Bank-full stages were exceeded in parts of the district Monday night, but the crest of the flood did not pass Binghamton until 3 p. m., on Wednesday, March 2, when the Chenango gage read 21.5 feet, or 1.6 foot below the big flood of March 2, 1902, and the Susquehanna gage read 17.7 feet, or 2.2 feet below the flood of 1902.

The damage was mostly confined to below Norwich, N. Y., on the Chenango River and below Sidney, N. Y., on the Susquehanna River, up to and including Binghamton. Fifteen or twenty factories were flooded, houses were under water, wires prostrated, railroads covered, and the like. Three bridges were lost, having an actual value of \$28,500, but which it will cost about \$70,000 to replace. The estimated damage for the district is about \$100,000, and it is believed that fully \$50,000 were saved by the information and warnings from this Bureau.—*J. R. Weeks, Local Forecaster.*

Albany, N. Y.—Flood warnings were issued for Albany and vicinity at 8 a. m., February 28, 1910, and forecast was made that the river would pass above the flood stage (12 feet) during the afternoon of February 28 and would continue high for several days. On the morning of March 1 a forecast was made that the water would approach the 19-foot stage at Albany within the next 24 hours.

The warnings and the forecasts were given to the public through the telephone, the weather maps, the newspapers, and the newspaper bulletin boards.

The warning was amply justified, as the river rose steadily for 3 days and continued above the flood stage from late in the afternoon of February 28 till the night of March 8, except that it fell slightly below the flood stage during a portion of March 7.

Ice gorges formed below this city and on March 2 backed the water up to 18.3 feet at 5 a. m. in Albany and to 21.5 feet at 5 p. m., at Troy, this being 6.3 feet above the flood stage at Albany and 7.5 feet above at Troy.

The warning was so generally heeded that there was very little loss in this vicinity that could have been avoided.

The money value of property destroyed and damaged by the flood in the Hudson and Mohawk valleys will probably reach about a quarter of a million dollars.

There was no damage to crops, and there was little loss through erosion, the ground being frozen.

The money value of property saved by the flood warning was probably about \$75,000.

The loss occasioned by enforced suspension of business through the flood was large, owing to the fact that the water

was so high that it stopped all freight traffic; passenger service was seriously delayed and numerous electric lines unable to operate. Numerous factories from Utica to below Albany were closed and thousands were thrown out of employment.

The water filled the basement in the Federal Building.

An accurate estimate of the loss occasioned by this flood is not possible at the present time.—*George T. Todd, Local Forecaster.*

MISCELLANEOUS.

The average number of days on which .01 inch or more of precipitation occurred for the district was 9; clear days, 11; partly cloudy, 8, and cloudy days, 9.

The average amount of sunshine was somewhat greater than during the preceding month, the average for the district being 160 hours, which is about 53 per cent of the possible for the month of February. The total amount for the month was greatest, 193 hours, at Washington, D. C., and the least, 118 hours, at Eastport, Me.

There were 8 days during the month when the sunshine averaged 80 per cent or more of the possible, 12 days with an average between 20 and 80 per cent, and 8 days with an average of less than 20 per cent.

SNOWFALL OF THE WINTER, 1909-10, IN NEW YORK.

GEORGE W. MINDLING, Assistant Observer.

The snowfall of the current winter in New York has been unusually heavy, the total amount for the 4 months, November to February, inclusive, varying from about 2 feet in Long Island to more than 20 feet near the east end of Lake Ontario. The amount of the snowfall in various parts of the State is shown by Table 1.

TABLE 1.—Snowfall, in inches, for selected stations in New York, 1909-10.

Stations.	Year.	Nov.	Dec.	Jan.	Feb.	Total for 4 months.	Ten-year average.	Greatest daily snowfall.			
								Nov.	Dec.	Jan.	Feb.
St. Lawrence and Champlain valleys:											
Canton.....	1900	7.7	6.8	14.4†	17.1	46	.....	5	1	7	4
Chazy.....		4.0	5.0	9.0	22.0	40	.....	4	3	4	10
Moir.....		5.0	10.0	21.0	37.5	74	.....	5	3	8	9
Ontario and Adirondack region:											
Adams Center.....	1899	8.5	94.0*	65.5†	85.0	253	157	4	14	6	14
Blue Mountain Lake.....		6.0	33.0	25.0	44.0	108	.....	3	12	6	12
Lake Placid Club.....		10.0	33.6	36.2	50.5	130	.....	5	8	6	11
Morehouseville.....		6.0	29.5	25.0	50.0	110	.....	3	4	6	12
Nehasane.....		12.3	66.0	39.0	57.8	176	.....	7	12	10	13
Owego.....	1899	6.6	42.1*	27.1†	39.6*	115	74	4	13	6	16
Palermo.....		4.0	62.3	57.4	56.9	181	.....	4	24	30	24
Western New York:											
Addison.....	1893	4.5*	5.5	25.0*	30.0*	65	36	4	3	8	12
Auburn.....		5.0	23.0	30.0	32.0	90	.....	3	6	9	14
Avon.....	1899	T.	10.5	18.5†	26.0*	55	36	T.	4	5	3
Binghamton.....	1899	3.2	6.9	30.6*	17.1	58	43	2	4	12	8
Brookport.....	1899	2.0	9.5	18.5	38.0*	68	.....	2	3	7	10
Buffalo.....	1901	4.6	25.0*	42.6*	43.7*	117	.....	.....	.....	.....	.....
Franklinville.....	1897	3.4	18.3	26.6	26.8†	73	64	2	2	8	8
Ithaca.....	1887	4.2	10.3	22.8†	21.2	58	48	4	4	6	9
East-central New York:											
Albany.....	1899	0.4	15.5†	14.0†	25.1*	52	37	.....	.....	.....	.....
Bouckville.....	1897	7.0	17.5	29.0*	25.5	79	82	5	4	6	6
Cooperstown.....	1897	3.0	14.0	33.5*	41.0*	92	58	.....	8	8	13
Glens Falls.....	1897	3.0	18.3	25.5	34.5†	79	56	2	10	6	10
Gloversville.....	1897	7.5	23.5	31.5	53.0*	116	78	4	10	6	14
Southeastern New York:											
Carmel.....	.....	2.0	13.0	17.0	15.0	47	40	2	12	6	7
Mohawk Lake.....	.....	3.2	11.0	18.0	25.0	57	.....	2	6	10	9
New York.....	1899	1.0*	11.4†	16.0†	5.3	34	26	1	9	13	5
Setauket.....	1897	T.	4.5	14.0†	3.0	23	23	T.	2	10	3

* Greatest amount for the month in the records available for comparison.

† Exceeded but once in the records used for comparison.

‡ Year in which records available for comparison begin.

A 10-year average for the 4 months above named has been computed for 15 selected, representative stations, and, from the values obtained, it appears that the total snowfall of the 4 months ranged from 20 to 60 per cent. above the normal, except in Long Island, where the amount was nearly equal to the 10-year average. As compared with a true normal, the

excess in snowfall was undoubtedly greater than has been stated, owing to the fact that the period used in computing means probably gives too high an average, for it includes the remarkably heavy snowfall of the present winter as well as that of 6 years ago. In the case of a few stations, whose records are such as to make possible the necessary computations, it was found that the 10-year averages were 10 per cent, or more, in excess of the averages for the last 20 years.

In the case of 17 stations, selected with due regard to the length and completeness of their records, the monthly amounts of snowfall for this winter have been compared with previous records for periods of 10 years or more. It is found that 12 of these stations show an amount, for one or more of the months of the current winter, in excess of the preceding records, while each of the others has amounts that have been exceeded but once in the period indicated in Table 1.

It is worthy of note that in the western portion of the State the snowfall was in excess of that of previous years to a greater extent than elsewhere. At Buffalo the amounts for December and January were greater than for the same months since 1901, and that for February, at Rochester as well as at Buffalo, is said to exceed all previous records, which cover the greater part of a century. An inquiry addressed to selected cooperative observers about the middle of February brought forth, at the end of the month, many interesting statements, from which the following have been selected as representative of western and central New York:

Addison.—The average snowfall for 20 years is 11.0 inches. The amount for 1910 was 25.0, and the maximum previous to this year, 22.5 inches. For February, the average for 20 years is 8.2, the maximum previous to this year 20.0, while the amount this year is 30.0 inches.—*H. R. Ainsworth.*

Cooperstown.—This has been a winter of unusual snowfall. The total for three months, December, January, and February, is 88.5 inches, while the sum of their averages for the last nine years is only 46.5 inches. The greatest amount for February since 1900 was 26.0 inches, until this year, when the amount was 41.0 inches.—*G. Pomeroy Keese.*

Brockport.—The snowfall for February was greater than for any other month in the last ten years.—*W. H. Lennon.*

TABLE 2.—Frequency of snowfall in New York, 1909–10.

Stations.	No. of days with a trace or more.				No. of days with 1 inch or more.			
	Nov.	Dec.	Jan.	Feb.	Nov.	Dec.	Jan.	Feb.
St. Lawrence and Champlain Valleys:								
Canton.....	8	26	21	19	2	2	4	6
Moir.....	7	14	14	13	1	5	7	9
Ontario and Adirondack region:								
Adams Center.....	6	26	27	27	4	20	21	23
Lake Placid Club.....	4	23	15	16	4	11	11	8
Morehouseville.....	4	15	11	15	3	15	9	13
Oswego.....		24	22	21		7	10	8
Western New York:								
Addison.....	4	13	14	15	1	2	9	7
Binghamton.....	7	17	17	11	1	2	6	4
Franklinville.....	5	25	28	16	2	10	9	8
Ithaca.....	6	20	18	17	1	3	1	3
East-central New York:								
Bouckville.....	2	10	14	9	2	7	11	8
Cooperstown.....	1	4	11	6	1	4	10	6
Glens Falls.....	4	7	12	9	1	4	9	9
Southeastern New York:								
Carmel.....	2	2	5	3	1	2	5	3
New York.....	4	6	10	6	1	3	3	1
Setauket.....	2	5	6	6	0	2	2	1

Snow occurred with greatest frequency over an area embracing the Adirondack region and extending westward into the counties near the east end of Lake Ontario. In this section the number of days in the 4 months on which 1 inch or more of snow fell ranged from 31 at Gloversville and 30 at Auburn to 34 at Lake Placid Club and 68 at Adams Center. In other

parts of the State the number ranged from about 30 down to 10, but it was only 7 at New York City and 5 at Setauket, on Long Island. In December snowfalls of 1 inch or more occurred on 11 days at Auburn and on 8 days at Gloversville, but much oftener throughout the Adirondack region and near the south-east shore of Lake Ontario, and less frequently farther south. Snow of similar amounts occurred with equal or greater frequency in January and February. The number of days with a trace or more, for the 4 months, was found to vary from 12 at Carmel to 86 at Adams Center. The average number for each of the 3 months, December, January, and February, was probably not far from 15, if we exclude that part of the State lying farther south than Binghamton. In Table 2 the frequency of snowfall for each of the 4 months is clearly set forth, the stations having been selected with a view to representing the conditions in different parts of the State as accurately as possible.

Heavy snowstorms occurred in each of the 4 months, as will be seen from the greatest daily amounts in Table 1. The greater part of the November snow fell with the storm of the 24th and 25th, which was an unusually heavy one for that month. In December there were 2 heavy snowstorms, the first occurring on the 13th and 14th and the second on the 25th and 26th. The latter was exceptionally severe over the southeastern portion of the State, where the amount of snowfall ranged from about 4 inches on Long Island to 18 inches or more near the Catskills. In January there were 3 snowstorms worthy of special mention, the first occurring on the 6th and 7th, the second on the 14th and 15th, and the third about the 29th. During the first of these 36.3 inches of snow fell at Palermo, Oswego County.

The heaviest snowstorm of recent years, for the State as a whole, occurred generally on the 12th of February, beginning in many localities on the 11th and continuing until the 13th. The snowfall from this storm averaged above 12 inches over probably two-thirds of the State. The amount was least near the St. Lawrence River and on Long Island, where the average was about 3 inches, and greatest near the central part of Oswego County, where more than 30 inches was recorded. Between the Atlantic coast and a line passing through Binghamton and Albany, the amount averaged fully 8 inches, or a little less than the snowfall of the Christmas storm of 1909, which, however, was comparatively light in the remainder of the State.

The temperature conditions of the winter were favorable to an unusually prolonged duration of the snow cover; December was decidedly cold; January brought little thawing, though its mean temperature was somewhat above the normal; and February was below the average in temperature. In the northern part of the State, the amount of snow on the ground gradually increased until about the middle of February, when warm weather caused considerable thawing. A maximum depth for the winter of 40 inches was attained at Lake Placid Club, 44 inches at Adams Center, 50 at Nehasane, and 54 inches at Blue Mountain Lake. Except at Lake Placid Club, the least depth of snow at these stations during the month of February was 2 feet or more. Mr. A. E. Cooley, the cooperative observer at Adams Center, makes the statement that the average depth of snow (for the 3 months) was the greatest since 1879. Over an extensive area in the northern part of the State, the snow formed an obstruction to traffic and transportation such as is seldom known; but in other sections the depth remained moderate and the excellent sleighing conditions that prevailed for many weeks have been a source of great convenience and a subject of frequent discussion and general comment.